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table placed beneath it and rotated one space to the left. The arguments ·00, ·01, . . . ·99 are written above the top row, and ·02, ·03, . . . ·99, ·00, ·01 below the bottom row. The vertical arguments may conveniently be written on a slip of card and applied to the cylinder when necessary.

On this cylinder is fitted a cylindrical sheath, capable of sliding up and down and of slipping round the cylinder. The length of the sheath is only 100 spaces, that is, half the length of the cylinder. This sheath is moved up to the top of the cylinder, so as to cover the upper half, and a zero mark is made over the antilog. of ·0000. Then thirty-eight windows are cut in the sheath so as to disclose the thirty-eight day-numbers called A, or, more precisely, so as to disclose the thirty-eight antilogarithms of the logarithmic day-constants known as $\log A$. Finally, arrows are drawn from window to window showing the order of succession. Three other sheaths are made in like manner for the sets B, C, and D.

In order, then, to obtain the thirty-eight quantities called cC for a star whose $\log c$ is, say, 9·2764, we have merely to shift the "C" sheath till its zero mark is in column 27 and row 64, whereupon the thirty-eight windows immediately disclose the thirty-eight required quantities cC ready to be transcribed without either addition, interpolation, or the eye-wearying process of *selecting* the right number from the rows and columns of a large table. The number strikes the eye, without requiring to be selected from its neighbours.

The *decimal significance* of the antilogarithms is, of course, not given by the cylinder, just as an ordinary antilogarithm table does not furnish us with the position of the decimal point. But the value of the first quantity may be easily ascertained, and then the decimal significance of the rest of the numbers may be determined by keeping an eye on the differences, and by the consideration that the ratio of any two cC's is the same for all stars.

Photograph of the Nebula ♅ I 168 Ursæ Majoris.

By Isaac Roberts, D.Sc., F.R.S.

The nebula is in R.A. 10^{h} 12^{m}, Decl., 41° 57′ north, and the photograph was taken on 1893 April 14, with an exposure of the plate during 4 hours. The scale of the enlarged photograph now presented is 1 millimetre to 24 seconds of arc.

The nebula is No. 3,184 in the *New General Catalogue*, and 2,052–2,053 in the *General Catalogue*.

Sir J. Herschel, in the *General Catalogue*, p. 83, describes 2,052 as pretty bright, very large, round, very gradually brighter

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in the middle; and 2,053 as pretty faint, very large, round, very gradually brighter in the middle.

Lord Rosse (*Phil. Trans.* 1861, pl. 27, fig. 13, and *Observations of Nebulæ and Clusters of Stars*, p. 82) states that the *preceding* part is probably a portion of a ring. "The nebulosity connecting the three principal knots is very, very faint, but I have no doubt of its existence. The faint branch *following* the bright nebulosity is more doubtful."

The photograph shows this to be a very interesting spiral nebula, almost perfect in outline. In the centre of the spiral is a star of 14th to 15th magnitude, and around it are formed the convolutions, each of which is broken up into stars; four of them (omitting the bright star on the north side) are sharply defined, and the others, which are numerous, appear to be in all stages of development between very faint star-like patches and the defined ordinary star images.

There is still nebulosity between some of the spirals, as well as between the stars in the convolutions.

Several photographs of spiral nebulæ have from time to time been presented to the Society, and each one of them shows the spirals to be broken up into stars, or into star-like condensations, and I think the cumulative evidence thus brought before us amounts to a demonstration of the formation of stars by the condensation of nebulosity, or by the aggregation of meteoric or other cosmic matter.

Photograph of the Nebula ♅ I 205 Ursæ Majoris.

By Isaac Roberts, D.Sc., F.R.S.

The nebula is in R.A. 9^{h} 14^{m}, Decl. north $51^{\circ}\cdot 34'$, and the photograph was taken on 1893 April 12, with an exposure of the plate during 3 hours and 30 minutes. The scale of the enlarged photograph now presented is 24 seconds of arc to 1 millimetre.

The nebula is No. 2,841 in the *New General Catalogue*, and 1,823 in the *General Catalogue*.

Sir J. Herschel, in the *General Catalogue*, p. 79, describes the nebula as very bright, large, very much extended in the direction $150^{\circ}\cdot 8'$, very suddenly much brighter in the middle; equal to a star of 10th magnitude.

Lord Rosse, in his *Observations of Nebulæ and Clusters of Stars*, p. 75, states that it is like the nebula in *Andromeda*, with the nucleus a little nearer the *following* edge than the centre. I "think there is a small part of detached nebulosity which seems to have a connection with the other," and he gives a rough marginal sketch.

The enlarged photograph, and more clearly the negative,

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